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PATENT DEPARTMENT - 26TH FLOOR
2000 MARKET STREET
PHILADELPHIA, PA 19103-3222

EXAMINER	
TUROCY, DAVID P	
ART UNIT	PAPER NUMBER
1792	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/773,822	HEDHLI ET AL.	
	Examiner	Art Unit	
	DAVID TUROCY	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5-9 and 11-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5-9 and 11-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendments, filed 6/15/2008, have been fully considered and reviewed by the examiner. The examiner notes the amendment to independent claim 1 and the cancellation of claim 3. Claims 1, 5-9, and 11-16 remain pending in the instant application.

Response to Arguments

2. Applicant's arguments filed 6/15/2008 have been fully considered but they are not persuasive.

The applicants arguments against the prior art are substantially the same as those previously presented. The examiners position remains the same as set forth in the prior office actions.

In response to applicant's argument that the examiner has combined an excessive number of references, reliance on a large number of references in a rejection does not, without more, weigh against the obviousness of the claimed invention. See *In re Gorman*, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991).

In response to the applicant arguments with respect to Fukuda '306 and Fukuda '136, the examiner notes the applicant has failed to address the teachings of JP H07-062546, which clearly and explicitly discloses supplying a single mixed gas (reactants and carrier gas) through a parallel plate electrodes with 1 power source (see figures) and discloses at claim 1 "a mixture of gases consisting of a reactive gas . . . and an inert gas, consisting of noble gas such as helium, argon, neon, or N_2 . . . between a pair of

electrodes disposed so as to face each other" (see claim 1 translation). This clearly and explicitly discloses the predictability of providing a single mixed gas between parallel plate electrodes using a mixture of reactant gas and N_2 and without the use of a noble gas, see the "or" in the quote which designates any of the listed inert gases can be used singularly and without the others.

In response to the argument against JP 10-27569, stating that the reference discloses requiring noble gas, the examiner notes the process as claimed includes comprising and JP 10-27569 discloses only generating the plasma with the helium and prior to substrate treating the helium is stopped and therefore the substrate treating process comprises a method that is carried out without the use of a noble gas. In other words, the claims as written do not exclude noble gas from being using in other process steps that are not represented in the claim because the claim states "said method is carried out without the use of a noble gas" and therefore this clause only modifies the described method. In any case, the examiner notes JP 10-27569 only is applied as a showing that there is a desire to remove noble gas from the process, i.e. motivation to use nitrogen as the plasma gas versus the other operable noble gases as taught by the other prior art references.

In response to the argument that Schutz require noble gas, the examiner notes that the prior art reference discloses a single example that does include noble gas, but the reference does not require noble gas and therefore this argument is not persuasive. The reference is supplied as a teaching of coaxial or parallel plate electrodes in combination with the teachings of the other prior art references.

Specifically, the applicants argue against the Fukuda '306 reference stating the reference teaches away from the instant invention, only discloses nitrogen as a secondary list, and stating that it is used in combination with noble gases not alone. The examiner disagrees with such allegations. The examiner is not contending that Fukuda '306 teaches nitrogen is the preferred embodiment, and the examiner notes the examples use helium and argon; however, Fukuda '306 teaches nitrogen is operable. Therefore, such a teaching is not a teaching away because Fukuda '306 does not discloses nitrogen fails to work. The statement, "Nitrogen can be also use as the inert gas", does not teach that nitrogen has to be used in combination with the other inert gases, but teaches that the inert gas may be only nitrogen. As cited as pertinent art in the previous office action, JP 10-275698 teaches forming atmospheric plasma without using a rare gas to greatly reduce the consumption thereof. Therefore even if the applicant's position were correct and Fukuda '306 discloses a process with nitrogen in combination with a rare gas, JP 10-275698, motivates one to modify that method to use no rare gas to greatly reduce the consumption.

The applicant argues against the JP 10-275698 stating that the process of the present claims require no noble gas, however, the examiner notes that the claims are not as narrow as applicants argue. Specifically, the claims require a process comprising depositing, wherein the depositing is carried out without adding noble gas to the carrier gas, however, the fact that there is an initial deposition with helium is not dispositive of the fact that JP 10-275698 discloses a process comprising depositing a

layer wherein the layer is deposited without adding noble gas to the carrier gas, i.e. a method comprising the steps of deposition without

The applicant argues against the Hammerschmidt reference stating the reference discloses other various coating techniques and such techniques are different from the claimed technique. While the examiner agrees Hammerschmidt discloses varying techniques, it is clear that those techniques are not meant to be limited but only exemplary of possible techniques.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The applicant has argued against Hammerschmidt in view of Fukuda '306 combined with Schutz, Yasumoto, Namaumi, Kamo, Haug, stating only what the tertiary reference fails to teach. Therefore, the examiner maintains that the obviousness of the rejection is based on the combination of the teachings and what those teachings suggest to one of ordinary skill the art. The test of obviousness is not an express suggestion of the claimed invention in any or all references, but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them (*In re Rosselet*, 146 USPQ 183). Accordingly, the examiner is maintaining the rejection below.

All other applicants' arguments are deemed moot because they are directed to newly added limitations that are addressed in the rejections that follow, specifically, the

added limitation of the process completed without a noble gas. However, the examiner notes the prior art, as applied in the prior rejections, clearly disclose the use of nitrogen as the plasma gas and nitrogen gas is not a noble gas and therefore the prior art discloses a process without a noble gas. The applicant continually argues that the prior art requires a noble gas, however, the examiner notes that Fukuda '306 discloses using an inert gas as the carrier gas and discloses nitrogen (Column 5, lines 58-Column 6, line 5). Fukuda '136 discloses that it is known in the art of atmospheric plasma generation to eliminate the use of noble gases during the plasma formation, including using any number of gases as the plasma generation gas (see for example paragraph 0010, 0187). Fukuda '136 discloses using such gases singularly, including nitrogen, because such is cheap and safe for discharging a plasma (see for example 0010, 0187). Additionally, JP 10-275698 teaches forming atmospheric plasma without using a rare gas to greatly reduce the consumption thereof and JP H07-062546 discloses N_2 as a carrier gas for atmospheric pressure plasma deposition (0002). Therefore, it remains the examiners position that the arguments regarding the prior arts requirement of noble gas is clearly merely attorney speculation and there is no factual support on the record that support the applicants position that the prior art applied by the examiner requires noble gas. The combination of references discloses N_2 gas as the plasma discharge and carrier gas is operable and while they may also disclose using noble gases one skilled in the art would predict successful result using N_2. Additionally, one would desire to use the N_2 versus the noble gases because the prior art discloses advantages include reducing the costs associated with the high cost noble gases. Please note that

the test of obviousness is not an express suggestion of the claimed invention in any or all references, but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them (In re Rosselet, 146 USPQ 183).

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Claim Objections

1. Claim 13 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 1 requires a platinum catalyst, the same as required by claim 13.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 1, 5-6, and 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6010798 by Hammerschmidt et al ("Hammerschmidt") in view of US Patent 6849306 by Fukuda et al ("Fukuda '306"), US Patent Publication 2003/02032136 by Fukuda et al ("Fukuda '136"), JP 10-275698, JP H07-062546, and Schütze et al ("Schütze").

Claims 1, 3, and 11-13: Hammerschmidt discloses a method for depositing a catalyst on a fuel cell electrode for use in a membrane electrode assembly under plasma chemical vapor deposition (abstract). Hammerschmidt discloses using a fuel cell electrode comprising a carbon cloth and membranes including carbon particles (Column 3, lines 15-25). Hammerschmidt discloses known polymer electrolyte membranes utilized in fuel cells including NAFION (Column 1, lines 55). Hammerschmidt discloses the preferred catalyst is platinum or platinum alloy (Column 1, line 26).

Hammerschmidt fails to disclose atmospheric plasma CVD by passing the reactants and including a carrier gas through the electrical discharge (Page 1689, Column 2, last paragraph).

However, Fukuda '306, teaching a known method of plasma coating surfaces at atmospheric pressure, discloses forming a catalyst layer by passing reactants and the carrier gas through an electrical discharge at atmospheric pressure (abstract, figures, Column 5, lines 25-42). Fukuda '306 discloses passing the reactants and carrier gas though a nozzle containing parallel-arranged electrodes, attached to a single power supply, and passing the gases directly between two electrodes (figure 1). Fukuda '306 discloses a substrate of a polymer substrate because of the low temperature of the plasma discharge (Column 6, lines 52-55). Fukuda '306 discloses the substrate advances beneath the nozzle (figures). Fukuda '306 discloses atmospheric pressure allows for increased production and films with uniform composition and physical properties (Column 1, lines 31-43).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Hammerschmidt to use the atmospheric pressure plasma jet as suggested by Fukuda '306 to provide a desirable catalyst coating on a fuel cell electrode with the reasonable expectation of success because Fukuda '306 discloses atmospheric pressure is advantageous because one would desire to reap the benefits of increased production and films with uniform composition and physical properties.

As for the requirement of without a noble gas: Hammerschmidt in view Fukuda '306 fails to explicitly state using a process without a noble gas. Fukuda '306 discloses using an inert gas as the carrier gas and discloses nitrogen (Column 5, lines 58-Column 6, line 5). Fukuda '136 discloses that it is known in the art of atmospheric plasma

generation to eliminate the use of noble gases during the plasma formation, including using any number of gases as the plasma generation gas (see for example paragraph 0010, 0187). Fukuda '136 discloses using such gases singularly, including nitrogen, because such is cheap and safe for discharging a plasma (see for example 0010, 0187). Additionally, JP 10-275698 teaches forming atmospheric plasma without using a rare gas to greatly reduce the consumption thereof and JP H07-062546 discloses N_2 as a carrier gas for atmospheric pressure plasma deposition (0002)

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to select any inert carrier gas, including nitrogen, because Fukuda '306 teaches of using nitrogen as the inert gas is suitable for atmospheric pressure plasma deposition and thus eliminate the use of rare gas to reduce consumption of the costly gases. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.,* 325 U.S. 327, 65 USPQ 297 (1945).

In other words, the examiner notes the prior art discloses N_2 solely as a known and suitable gas for plasma generation and depositing a film and therefore using N_2 without a noble gas would have led to predictable results to one of ordinary skill in the art and one would desire to reap the benefits of a cheap and safe plasma discharge. Also, it would have been obvious to one of ordinary skill in the art to have modified Hammerschmidt in view of Fukuda '306 to use an atmospheric plasma using nitrogen as the discharge gas because Fukuda '136 discloses such results in a safe and cheap plasma discharge, JP 10-275698 discloses that removing noble gases from the

discharge gas greatly reduces the consumption of rare gases, and JP H07-062546 discloses such is known and suitable in the art of atmospheric pressure plasma generation.

Additionally, the combination of references discloses N_2 gas as the plasma discharge and carrier gas is operable and while they may also disclose using noble gases one skilled in the art would predict successful result using N_2. Additionally, one would desire to use the N_2 versus the noble gases because the prior art discloses advantages include reducing the costs associated with the high cost noble gases. Please note that the test of obviousness is not an express suggestion of the claimed invention in any or all references, but rather what the references taken collectively would suggest to those of ordinary skill in the art presumed to be familiar with them (In re Rosselet, 146 USPQ 183).

Hammerschmidt in view of Fukuda '306 fails to disclose a single mixed gas or reactants and carrier gas as the only gas stream flowing between the electrodes. The examiner cites JP H07-062546 as a teaching of supplying the combination of reactant gas and carrier gas directly between the two electrodes as a single gas mixture using a single power source (see figures and accompanying text). JP H07-062546, which clearly and explicitly discloses supplying a single mixed gas (reactants and carrier gas) through a parallel plate electrodes with 1 power source (see figures) and discloses "a mixture of gases consisting of a reactive gas . . . and an inert gas, consisting of noble gas such as helium, argon, neon, or N_2 . . . between a pair of electrodes disposed so as

to face each other" (see claim 1 translation). This clearly and explicitly discloses the predictability of providing a single mixed gas between parallel plate electrodes using a mixture of reactant gas and N_2 and without the use of a noble gas, see the or in the quote which designates any of the listed inert gases can be used singularly and without the others. Therefore JP H07-062546 discloses that such an arrangement is known and suitable in the art of atmospheric plasma generation and it would have been obvious to one of ordinary skill in the art to have modified Hammerschmidt in view of Fukuda '306 to supply a single mixture of reactant gas and carrier gas directly between two electrodes because such is known in the art and one of ordinary skill in the art would have expected to successfully provide an atmospheric plasma. Alternatively, JP H07-062546 discloses an atmospheric plasma process that comprises supplying only a single mixed gas between two opposing electrodes is a known in the prior art and one of ordinary skill of the art could have combined the teachings of the prior art. All the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. See *KSR Int'l Inc. v. Teleflex Inc.*, 127 S Ct. 1727, 1741, 82 USPQ2d.

As for the requirement of Coaxial arranged electrodes: Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, and JP H07-062546 teach all the limitations of these claims as discussed above, including providing an electrical discharge by

parallel electrodes, but the references fails to teach of coaxial electrodes. However, Schütze, teaching of an atmospheric plasma jet, discloses known and suitable methods for producing an electrical discharge include parallel electrode plates and coaxially arranged electrodes (Page 1690 Paragraph bridging column 1 and 2, Page 1689 Column 1 Last Paragraph). Therefore Schütze discloses parallel plate electrodes are equivalent to coaxially arranged electrodes for providing an electrical discharge during atmospheric plasma generation. Substitution of equivalents requires no express motivation. *In re Fount*, 213 USPQ 532 (CCPA 1982); *In re Siebentritt* 152, USPQ (CCPA 1967).

Claim 5: Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze fails to explicitly disclose scanning the nozzle over the substrate, however, Fukada discloses moving the substrate relative to the nozzle and there are three equivalent ways to coat a large surface, moving nozzle with a stationary substrate, moving substrate with a stationary nozzle, or moving both the nozzle and the substrate all of which is within the skill of one ordinary in the art. Substitution of equivalents requires no express motivation. *In re Fount*, 213 USPQ 532 (CCPA 1982); *In re Siebentritt* 152, USPQ (CCPA 1967). Alternatively, it would have been obvious to one of ordinary skill in the art to modify Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze to scan the nozzle over the substrate with a reasonable expectation of successfully coating the membrane. The prior art can be modified or combined to reject claims as prima facie obvious as long as there is a

reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-06254, and Schutze and further in view of US Patent Publication 2003/0096154 by Yasumoto et al ("Yasumoto").

Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze teach all the limitations of these claims as disclosed in the 35 USC 103(a) rejection above, but they fail to teach spraying the catalyst on the surface of the polymer electrolyte membrane.

However, Yasumoto, teaching of a method for spraying a catalyst with a carrier gas, teaches of spraying the catalyst directly onto the surface of the polymer electrolyte film or onto a porous conductive electrode substrate (Paragraph 0014). Yasumoto also discloses by spraying directly onto the film, the catalysts particles become embedded in the film and therefore the cell performance is improved (Paragraph 0016).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze to apply the catalyst directly onto the surface of the polymer electrolyte membrane as suggested by Yasumoto to provide a desirable catalyst layer on a electrolyte membrane with the reasonable expectation of success

because Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze teaches spraying a catalyst on a porous electrode film and Yasumoto teaches that spraying the catalyst directly onto the polymer electrolyte membrane increase the cells performance over a catalyst sprayed on a porous electrode film.

6. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze and further in view of US Patent Publication 2004/0180250 by Nanaumi et al ("Nanaumi").

Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze teach all the limitations of these claims as disclosed in the 35 USC 103(a) rejection above, but they fail to teach spraying the catalyst on the surface of the polymer electrolyte membrane comprising a acrylic based polyelectrolyte/fluoropolymer blend or a polyhydrocarbon-based sulfonic acid.

However, Nanaumi, polymer electrolyte membrane structures that provide inexpensive electrode structure and have excellent power generation efficiency, discloses using a hydrocarbon-based sulfonic acid (Paragraph 0007, 0010). Nanaumi teaches that such electrolyte polymer membranes comprise copolymers of an acrylic based polymer and a fluoropolymer (Paragraph 0012-0015).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze to use the polymer electrolyte membrane structure suggested by Nanaumi to provide a desirable catalyst on a membrane with the reasonable expectation of success because Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze to teaches depositing a catalyst onto a polymer electrolyte membrane and Nanaumi teaches of known polymer electrolyte membrane structures that are inexpensive and have excellent power efficiency.

7. Claim 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze and further in view of US Patent Publication 2003/0059659 by Kamo et al ("Kamo").

Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze teach all the limitations of these claims as disclosed in the 35 USC 103(a) rejection above, but they fail to teach of a catalyst layer including a binary and ternary platinum alloy using metals from column 4-11 of the periodic table.

However, Kamo, teaching of fuel cell equipment using an electrolyte membrane, discloses while the cathode catalysts is known to be fine platinum particles, the anode side comprise fine particles of platinum and ruthenium or platinum/ruthenium alloys (paragraph 0066). In addition Kamo discloses it is advantageous to combine the noble

metal components with a third component selected from iron, tin, rare earth elements, etc. to stabilize and extend the life of the electrode (Paragraph 0067).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze to use the platinum/ruthenium alloy as suggested by Kamo to provide a desirable catalyst layer on a electrolyte membrane with the reasonable expectation of success because Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze teaches an polymer electrolyte membrane with a platinum catalyst layer and Kamo teaches that platinum/ruthenium alloy is a known substitute for platinum and ruthenium particles for an anode catalyst and additional elements increase the catalyst stability and life span.

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze and further in view of Haug et al ("Haug").

Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze teach all the limitations of these claims as disclosed in the 35 USC 103(a) rejection above, but they fail to teach of depositing multiple catalyst layers.

However, Haug, teaching of increasing the PEM catalyst effectiveness, discloses using a multilayer electrode technique increases the regions of active platinum by increasing the number of platinum layers deposited (Pg A284, Column 2 last paragraph). In addition, Haug discloses that Membrane electrode assemblies with

multiple layers of platinum outperform those with only a single layer (Page A285, Column 1, First Paragraph).

Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze to use the multiple platinum layers as suggested by Haug to provide a desirable catalyst layer on a electrolyte membrane with the reasonable expectation of success because Hammerschmidt in view Fukuda '306, Fukuda '136, JP 10-275698, JP H07-062546, and Schutze teaches an polymer electrolyte membrane with a platinum catalyst layer and Kamo teaches that multiple platinum layers increases the region of active platinum over a single platinum layer.

Conclusion

2. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID TUROCY whose telephone number is (571)272-2940. The examiner can normally be reached on Monday, Wednesday and Friday from 7 a.m. - 6 p.m., Tuesday and Thursdays 7-10 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David Turocy/
Primary Examiner, Art Unit 1792